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THE CONSTANT-SPEED AIRSCREW

*An Explanation of the Principle of the Hamilton Standard:
Advantages to be expected*

DURING the last year or two references have frequently appeared to the new constant-speed airscrew developed by Hamilton Standard Propellers, a division of United Aircraft Corporation of East Hartford, Connecticut, U.S.A., but so far it has not been possible to publish a description of the principle upon which the constant-speed airscrew works. The restrictions which prevented publication of a description have now been removed, and the principle is explained in the following article. Readers of *Flight* will scarcely need to be reminded that the De Havilland Aircraft Co., Ltd., holds the licence to build Hamilton Standard variable-pitch airscrews in this country, and it is to be expected that the D.H. constant-speed v.p. airscrew will soon be seen on a number of British aircraft.—Ed.

As is well known, the primary function of any constant-speed airscrew is to permit the engine to run at desired r.p.m. regardless of altitude or forward speed of the aeroplane. This is important for engine operation, since power depends on both the r.p.m. and the throttle opening. The constant-speed airscrew makes possible the control of

engine speed independent of the throttle. From one standpoint it acts as a governor, holding r.p.m. constant, no matter whether climbing, diving or flying level. From another standpoint it acts as a controllable load, permitting the engine to develop as much of its full rated power as the pilot wishes.

This is accomplished by automatic change of airscrew pitch. In the Hamilton Standard design the pitch is shifted by oil pressure, the airscrew itself being basically the same as the Hamilton Standard two-position controllable. Counterweights acted on by centrifugal force provide the operating force to move the blades toward high pitch, and the oil pressure works in the opposite direction against the counterweights, setting the pitch to any intermediate position between full low and full high.

Pitch is automatically selected by a separate unit called the constant-speed control, which regulates the oil pressure in the airscrew-operating cylinder. A simple gear pump in this unit boosts the engine oil pressure up to 180-200 lb. per square inch, where it is maintained by means of a relief valve. Although considerably less pressure is

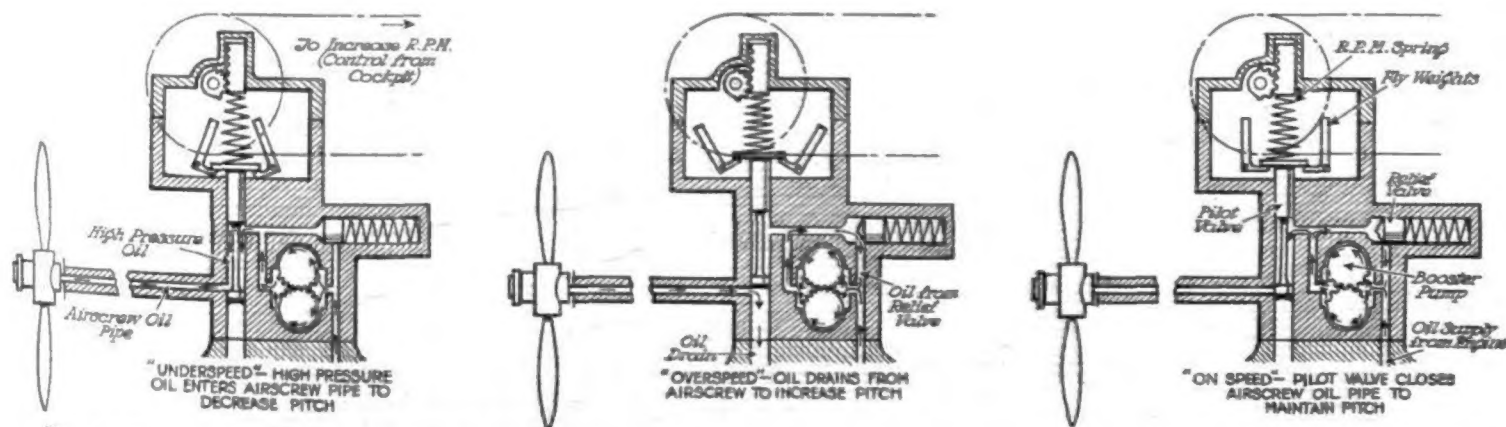


Fig. 1. Diagrammatic representation of airscrew, constant-speed control, and booster pump for three different operating conditions.